Committee for Earth Observation Satellites
17th Plenary Meeting
Colorado Springs, Colorado
November 19-20, 2003

CEOS/17/WGISS

Item 9.1

Submitted by Terry Fisher
WGISS Chair, Canada Centre for Remote Sensing

Report of Working Group on Information Systems & Services (WGISS)

This is annual report of WGISS to the CEOS Plenary. In addition to this report there are two Power Point Presentations. The first gives the status of WGISS activities and the second is the WGISS portion of a joint report with the Working Group on Calibration and Validation on the Core Test Sites activity.

The WGISS report has the following components: overview of the WGISS organization, status of the ongoing tasks, description of new initiatives, the WGISS response to Plenary priorities and the WGISS recommendations and 3 year accomplishments.

The 17th Plenary participants are invited to note the information in these presentations and are asked to approve the following WGISS recommendations:

- **Approval of John Faundeen as WGISS chair for the period November 2003 to November 2005**
- **Approval of Ivan Petiteville as WGISS Vice-chair for the period November 2003 to November 2005**
- **Approval of the initiation of the CEOS EO Data Portal Project**

The WGISS Report To Plenary 17: Colorado Springs, Colorado

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1. WGISS Overview

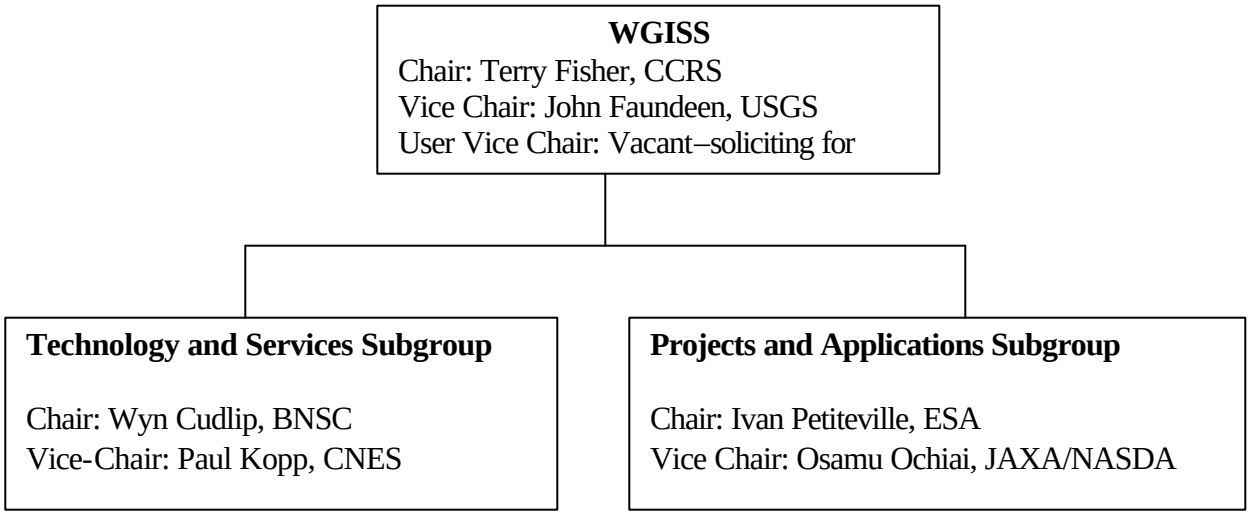
The role and work of WGISS is driven by the belief that information systems and services are an essential element of successful Earth observation programmes. Users need to be able to find and access products on a global basis. Harmonised and coordinated data and information systems that easily and efficiently provide access to data, information and services are essential if this is to be achieved.

WGISS is there to address these aspects. It facilitates and coordinates Earth observation data and information management and services throughout CEOS organisations. By so doing it sets out to provide data providers and users with harmonised data and information systems on a global scale.

To this end WGISS, and its predecessors the Working Group on Data (WGD) and the interim Working Group on Network Services, has developed a full range of tools, techniques, services and guidelines addressing information systems and services.

1.1. WGISS Structure

WGISS has two subgroups, Technology and Services and Projects and Applications as shown below:



1.2. How WGISS Works

The WGISS work is executed with multi-agency Task Teams focussed on specific application or technology elements. The Task Teams complete their work at the semi-annual WGISS meetings, with email lists and telecons.

The WGISS Task Teams are:

WGISS Level	
WGISS Information Infrastructure	Jeff Smith (NASA)
Technology & Services Subgroup	
IDN	Lola Olsen (NASA)
CEOS ICS	Jolyon Martin (ESA)
Data Services	Bernhard Buckl (DLR)
Networks	Jeff Smith (NASA)
Archive	Stu Doescher (USGS)
GRID	Yonsook Enloe (NASA)
EO/GEO Workshop	Clive Best (EC/JRC)
Projects and Applications Subgroup	
Global Datasets	Lorant Czaran (UN)
Global Mapping Book	Mike Botts (NASA/UAH)
WTF CEOP	Osamu Ochiai (JAXA/NASDA)
WTF Core Test Sites (WGCV)	John Faundeen (USGS)
Oil Spill Drift Prediction Project	Ivan Petiteville (ESA)
CEOS EO Data Portal (Proposed)	W. Cudlip (BNSC)

1.3. WGISS 2003 Meetings

Since its formation WGISS has had four meetings per year, two WGISS Plenary meetings and two Subgroup meetings. This year WGISS decided to combine the WGISS Plenary and subgroup meetings, to improve communications and to reduce travel costs. CNES hosted the May 2003 combined meeting of WGISS and Subgroups, and GISTDA and NASDA jointly hosted the September 2003 meeting.

1.4. WGISS Liaison

WGISS liaises with many international organizations. The list of the WGISS points of contact for these agencies follows:

Open GIS Consortium	Allan Doyle (NASA)
CCSDS	Wyn Cudlip (BNSC)
ISPRS	Liping Di (NASA)
ISO TC211	Lorant Czaran (UN)
Climate & Meteorology	Howard Diamond (NOAA)
Global Map Project	Osamu Ochiai (JAXA/NASDA)

1.5. WGISS Outreach

WGISS has an active outreach program described in the following list:

- With the support of JAXA/NASDA maintains the CEOS web site, www.ceos.org
- Updated the WGISS web site to improve outside access to WGISS Information, including several project web sites
- Regular promotional activities at IDN nodes, e.g. various scientific conferences, tutorial at Joint Committee for Antarctic Data Management
- Continued operation of demonstration portal developed for World Summit on Sustainable Development in Johannesburg at http://wgiss.ceos.org/gisd/
- EO Working Group at the Open GIS Consortium
- Distribution of the CEOS CDROM and operation of web site http://ceos.cnes.fr
- Two papers submitted for ISPRS conference in Istanbul July 04

1.6 WGISS Test Facilities

Test Facilities offer a framework under which WGISS works in partnership with selected international science and EO projects to test and develop information systems and services to meet their requirements.

Specific Test Facilities are set up to address the needs of individual projects. These demonstrations advertise WGISS technical capabilities, promote science efforts, facilitate improvements, and encourage coordination of Information Systems and Services across the spectrum of EO space operations.

2.0 Status of WGISS Tasks

2.1 Summary

The following is a summary of the status of WGISS Tasks:

- Archive
  - Purge alert in place
  - New agenda established from Agency survey
  - Archive interchange format completed and has been adopted by ESA's CRYOSAT Program

- Discovery
  - The International Directory Network (IDN) has been operational since 1990 and has 13,000+ data set descriptions with 50,000+ user sessions / month

- Search
  - CEOS Interoperable Catalog System provides access to 2000+ catalogues

- Access
  - Established and maintain a virtual CEOSnet, with regular network performance monitoring
  - Adopted several OGC implementation standards that promote interagency interoperability
  - Conducted pilot/demontration projects using OGC standards to demonstrate interagency interoperability, e.g. WSSD, GOFC,
  - Guidelines
  - Data format and browse guidelines issued

- Data rescue
  - African data sets rescued by USGS at WGISS instigation for developing countries

- Coordinated Enhanced Observing Period
  - Completed draft Project Plan, with steadily greater understanding of CEOP science requirements (determining a wide variety of science requirements and possible WGISS roles)

- Oil Spill Drift Prediction Project
  - Developed pilot application

- CEOS EO Data Portal Project
  - Completed project plan
  - Seeking approval at this Plenary

2.2 WGISS Test Facility for Core Test Sites

WGISS is working with the WGCV to develop a facility to make data for calibration sites more accessible.

The project objectives are:

- Establish linkages between test sites and data archives to facilitate improved product access. Promote knowledge assessments and interoperability of earth observation data to address the challenges of the Terrestrial Carbon Observation (TCO) theme.
- Foster validation efforts by leveraging infrastructure and protocols developed through existing site activities.
- Address science questions suitable for combined field and multi-resolution data.
- Encourage the collaboration between validation investigators and existing science networks and programs.
- Facilitate validation activities directed at better product knowledge and assessment of the products' stability and interoperability.

Project Summary

- Phase 1 Completed - September 2003
  - Additional SPOT Vegetation Requirements Accommodated
  - WGCV science community pleased
  - WGISS-16 Core Sites WTF Preliminary Demo

- WGCV-21 Core Test Sites WTF Preliminary Demo - October 2003
- CEOS Plenary Demo - November 2003
- Phase 2 Requirements Captured - Summer 2003
- Phase 2 WTF Core Test Sites Development & Delivery - 2004

.

Future work on this Test Facility is described below:

- Incorporate GTOS "Terrestrial Ecosystem Monitoring Sites"
- Add CEOP/NASDA, CSIRO, GT-net, ILTERS sites
- Provide science community with immediate, easily accessible data from CEOS member sensors

- Provide a focus for ongoing satellite, aircraft, and ground data collection for validation of CEOS member satellite/sensor products
- Provide scientists with sets of readily accessible *in-situ* and CEOS member instrument data for algorithm validation and improvement
- Build on infrastructure of existing scientific networks and validation sites
- Realize international cost-sharing opportunities

2.3 WGISS Test Facility Coordinated Enhanced Observing Period (WTF/CEOP)

The objective of the WTF/CEOP are:

- Support the development and implementation of the IGOS Water Cycle Theme;
- Provide information system and service input into the data handling (EO and in-situ) issues related to numerical models and data analysis; and,
- Aid in the development of the Coordinated Enhanced Observing Period (CEOP) data sets.

The main area that that the CEOP project is requesting support is "data integration". That is integration of Satellite, In-situ and Model output data with various science analysis requirements (e.g. development and validation of soil moisture, snow and precipitation algorithms; perhaps validation of climate model output data). While this is complicated it offers a very good potential for defining future data utilization technologies. WGISS is working with CEOP scientists to determine CEOS member technologies that can be applied to CEOP. The WTF/CEOP Project Plan was completed October 31, 2003.

2.4 **GRID Technology**

The Kyoto Plenary in November 2001 approved the WGISS Task of testing the GRID technology with Earth Observation applications.

GRID provides basic middleware services for seamless distributed computing and data management. IBM has stated, "GRID is the next Internet". GRID provides the following capabilities of interest in EO applications:

- Authenticate users and providers of data
- Improve performance of data reception and delivery of data
- Pprovide a scalable infrastructure for the management of distributed storage resources and data

To fully test the usefulness of the GRID technologies the WGISS Grid Task Team is coordinating the following application projects:

- ESA Data Integration Project
- NOAA NOMADS
- NASA Advanced Data Grid
- George Mason University EOSDIS Data Pools
- University of Alabama Scientific Data Mining Project
- USGS Data Delivery Project

Many issues are common to all six projects and the WGISS Task Team is working together to gain insight into these common problems. To date the following has been accomplished:

- All 6 Grid Application Projects have installed and tested common Grid software
- Grid monitoring prototype working
- CEOS Certificates for secure access being tested
- Firewall Best Practices document drafted
- Identified and studying technical areas of common interest

The following are the things that the Task Team will be working on in the near future:

- Get Application Projects working on the Grid
- Explore potential additional collaborations and extensions to the 6 Application projects
- Identify potential global science programs (e.g. WTF Core Test Sites, WTF CEOP, ...) that Grid can support

2.5 Oil Spill Prediction Project

For the past 2 years WGISS has been seeking opportunities to work with the Oceans community. The Oil Slick Predictions Project is a small Pilot that WGISS initiated to demonstrate the usefulness of WGISS technology in an Oceans application.

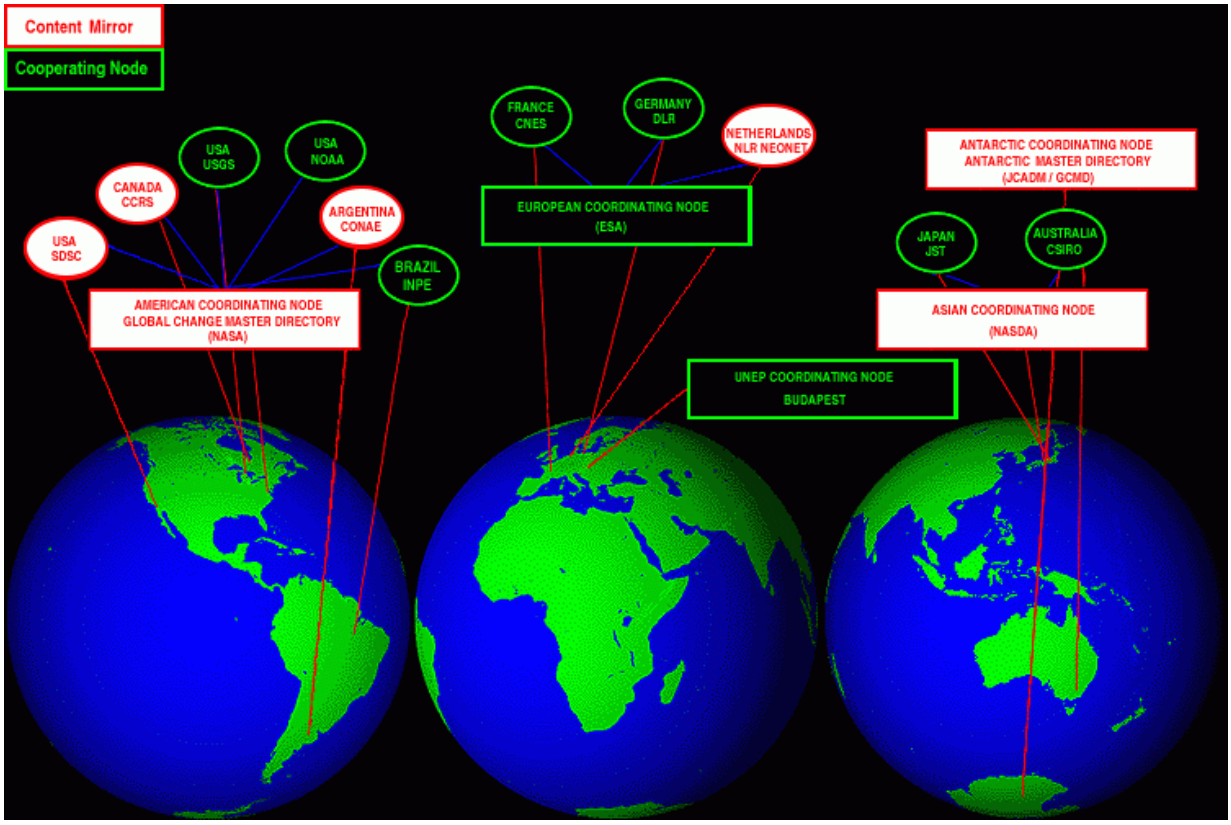
Accurate Oil Spill Drift Predictions require input data from several distributed data providers (oil slick metadata, wind fields, sea surface currents, GIS layers,..) and several sophisticated drift models from various distributed service providers (e.g. tide models on North Sea not suitable for Mediterranean Sea).

The objectives of the WGISS Oil Slick Predictions Project is to permit a user with a Web browser and a slow Internet connection, to select an oil slick and visualize in real time the predicted drift of the selected oil spill using transparently distributed data & services providers. A Pilot implementation will be demonstrated at the

Plenary. Note that this is possible thanks to the most recent standards-based service-chaining technologies.

2.6 International Directory Network (IDN)

The IDN is the most enduring and possibly most successful WGISS project. It provides access to metadata for over 13,000 earth observation, geomatics and in-situ datasets. It has been operational since 1990. The network has more than 50,000 user sessions per month and IDN team has developed 22 application portals tailored for different communities. The diagram below shows the IDN nodes.



3.0 New Initiatives

3.1 WGISS Information Infrastructure

During the past few months WGISS initiated a Task to renew its Web site. The rationale for this was:

- Improve communication between WGISS members
- External promotion of WGISS activities
- Improve continuity as WGISS chairs change

NASA is developing and hosting the site at: http://wgiss.ceos.org

3.2 CEOS EO Data Portal Project

WGISS is proposing a new initiative to make EO data more accessible to users with low speed connectivity to the Internet.

The background/rationale for this project is:

- NASA has given the UN two global mosaics of Landsat data created from data in 1990 and in 2000;
- Several UN Agencies have indicated that they have requirements for better access to these data. These agencies include: IAEA (Atomic Energy Agency) and CTBTO (UN Comprehensive Nuclear-Test-Ban Treaty), the UN Cartographic Section and Department of Peacekeeping Operations (DPKO), UNEP and FAO;
- However, the UN presently lacks specific and dedicated resources to make this data easily and freely available online for developing products required by developing countries;
- Land elevation data is also becoming available from the Shuttle Radar Terrain Mapping mission and this could be used to enhance the applicability of the Landsat Data.

Through this project WGISS will assist the UN in promoting the exploitation of the Landsat and SRTM data by:

- Coordinating the deployment of data mirror sites hosted by various Space Agencies around the world;
- Working with standards bodies (e.g. the OGC) to accelerate the development of relevant standards;
- Encouraging the development of standards-based software tools and associated web-based services;
- Employing a phased development over two years, starting with simple map display capability, leading eventually to chained services that can be tailored for specific applications;

Eleven WGISS Agencies have indicated an interest in working on and/or hosting EO Data Portal servers. ISPRS has indicated interest in working with WGISS on this project. WGISS will determine if this project can be linked to WSSD follow-up activities in Area 5 (GIS, Mapping etc.).

The proposed Work Plan (WP) for this project is:

- WP1 Overall Co-ordination and management
  - Resolve data policy issues
- WP2 Initial Server (WMS) deployment:
  - Work with Mosaic Project for Landsat 7 2000 data (3,2,1).
  - Develop WMS Server for Landsat 1990 RGB (7,4,2) data.
  - Initial client development; Use adaptation of UN and other suitable clients.
  - Further server deployment for Landsat 1975 dataset.
  - Establish links with vector (WFS) servers for overlay data.

- WP3 Initial WMS/WFS deployment for SRTM 90m resolution data
- WP4 3D Viewing development with OGC Terrain Specification
- WP5 Data Server (WCS) development/deployment with further client development including data processing
- WP6 Service chaining developments
- WP7 Possible integration with GRID activities

4.0 WGISS Response to Plenary Priorities

4.1 Plenary 16 Action Items

Action 16-08: CEOS Members and Associates to send the WGISS Chair any nominations for the next WGISS Vice Chair by 31st March 2003

ESA has nominated Ivan Petiteville, WGISS unanimously endorses Ivan for this position

Action 16-09: CEOS Working Group chairs to investigate closer links between Working Groups and the IGOS Themes and to report to the 17th CEOS Plenary

- WGISS has implemented a Test Facility in co-operation with the WGCV
- WGISS is developing a Test Facility with the CEOP (Water Cycle)
- WGISS has developed an Oil Spill Drift Prediction project to explore the use of WGISS capabilities in support of ocean applications

4.2 WGISS Response to Priority Goals in the CEOS 5 Year Plan

1. User consultation - WGISS will obtain timely feedback on their endeavours through a process of consultation with the user community. It will endeavour to shape the work of the task teams towards meeting user requirements and to advise on consultation with users outside CEOS.

Over the past two years WGISS has been focusing on user interaction through our WGISS Test Facility (WTF) activities, in fact this has become our prime method of moving forward. WGISS has also reorganized it's own structure to better address user requirements and to align better with Plenary objectives WGISS has updated the Terms of Reference for its User Vice-Chair to better focus WGISS activity

2. Data and information management - WGISS will define guidelines containing procedures and standards to be followed in the management of data to establish and maintain its quality, availability, accessibility and reliability. These guidelines will evolve in step with relevant technological developments.

WGISS recognizes the importance of these activities and has Task Teams (Archive, IDN, Data Services, Network, GRID and ICS) producing best practices, technology demonstrators

3. User services - WGISS will co-ordinate the provision of a comprehensive suite of global services - with the emphasis on capabilities offered by networks.

The International Directory Network and the Interoperable Catalog System address this element in an ongoing, operational way

4. Data standards - WGISS will recommend defined form and content for the distribution and interchange of data and metadata between agencies and with users.

WGISS works closely with ISO, OGC and other standards-based organizations that affect the distribution and interchange of data. For example DLR and NASA participate on the OGC Revision Working Group for OpenGIS Consortium' s Web Coverage Server Specification.

WGISS projects and demonstrations use standards to achieve interagency interoperability.

5. CEOS information services - WGISS will establish CEOS Information Services to support the work of WGISS members and to aid communication of information about CEOS to external bodies, users and potential users.

With the assistance of JAXA/NASDA, WGISS supports the CEOS Plenary web site. WGISS also maintains a site at wgiss.ceos.org and project web sites to support communication between members and as an important form of outreach.

6. Promotion - WGISS will aim to ensure that the standards and initiatives recommended by CEOS are employed by Earth observation provider and user agencies. To this end, it will report its achievements to the CEOS Plenary and through CEOS publications.

WGISS has revamped it's own web site to better promote WGISS activities. WGISS has prepared a number of demonstrations, e.g. at CEOS Plenaries, WSSD in Johannesburg

WGISS has regular promotional activities through the IDN & ICS activities, the EO-GEO Conference, and the distribution of brochures. The two papers planned for ISPRS are relevant examples, also

7. Developing country issues – WGISS will endeavour to ensure that its work can contribute to the effective use of Earth observation in developing countries.

The CEOS CDROM has been a concerted effort of WGISS in the past. At the urging of the UN, WGISS has also supported environmental agencies in Africa, for over three years, by providing data rescue services for aging magnetic tapes. At the request of our UN representative WGISS is investigating as means to support developing countries by providing access to Landsat and SRTM data for the world.

8. WGISS will increase its focus on global science programmes by providing support to these through development of test facilities. WGISS propose to modify their organizational structure to reflect this new emphasis.

WGISS has reorganized to provide a strong focus on serving Global Science programs. Much of the current WGISS activities are in this area, e.g. the WGISS Test Facility (WTF) for WGCV Core Test Sites and the WTF for CEOP

5.0 Plenary Recommendations

The Plenary is asked to approve:

- John Faundeen as WGISS chair for the period November 2003 to November 2005
- Ivan Petiteville as WGISS Vice-chair for the period November 2003 to November 2005
- Implementation of the CEOS EO Data Portal Project

The following items are for the information of Plenary members:

- WGISS has closed its CD-ROM Task Team but CNES will maintain http://ceos.cnes.fr and will distribute remaining copies of CD-ROM
- WGISS has closed the CEOS Information Infrastructure Task Team but JAXA/NASDA will continue to support CEOS Web site

Plenary members are asked to recognize the NASA's commitment to the IDN.

5.1 WGISS 3-Year Accomplishments

The following are the major accomplishments of WGISS over the past 3 years:

- Alignment with CEOS Plenary priorities / 5 Year Plan;
- Integration of EO Infrastructures with broader Spatial Data Infrastructures, e.g. endorsement of Open GIS Consortium standards for CEOS agency interoperability;
- Multiple successful application demonstrations. GOFC at Kyoto Plenary (2001), WSSD demonstration at Johannesburg (2002), WTF Core Test Sites at Colorado Springs Plenary (2003);
- Stream lined organization, eliminated 2 meetings /year;
- Developed close working relationship with WGCV;
- Substantial increase in usage of CEOS IDN and Interoperable Catalog System;
- WGISS WTF/GOFC work stimulated JAXA/NASDA to initiate operational Forest Fire and Forest Cover applications in Thailand and Digital Asia prototyping.